

CLAIMS

What is claimed is:

1. A computer system, comprising:
 - a computer bus coupling together a plurality of bus devices;
 - a bus arbiter coupled to the computer bus, said bus arbiter receiving requests from said plurality of bus devices to obtain access to the computer bus;
 - wherein said bus arbiter resolves conflicting requests from said bus devices based on the workload of the bus devices that request access to the computer bus.

1 2. The system of claim 1, wherein each of said plurality of bus devices includes a queue in
2 which pending operations are stored while the bus device awaits access to the computer bus.

1 3. The system of claim 2, wherein each of said plurality of bus devices asserts a signal to said
2 bus arbiter when one or more operations are pending in the queue.

1 4. The system of claim 3, wherein each of said plurality of bus devices also asserts a signal to
2 said bus arbiter indicating the number of operations pending in the queue.

1 5. The system of claim 4, wherein said bus arbiter compares the signal indicating the number
2 of operations pending in the queue from any bus devices requesting access to the computer bus,
3 and awards access to the computer bus to the bus device with the most operations pending in its
4 associated queue.

1 6. The system of claim 5, wherein said bus arbiter breaks any ties between bus devices with
2 an equal number of operations pending in the queue based on a predetermined priority value
3 assigned to each bus device.

1 7. The system of claim 5, wherein said bus arbiter breaks any ties between bus devices with
2 an equal number of operations pending in the queue based on the length of time since each device
3 was last granted access to the computer bus.

1 8. The system of claim 5, wherein the signal indicating the number of operations pending in
2 the queue comprises a multi-bit signal.

1 9. The system of claim 8, wherein the multi-bit signal comprises n bits, with $2^n =$ number of
2 entries in the queue of each device.

1 10. The system of claim 3, wherein each of said plurality of bus devices also asserts a signal to
2 said bus arbiter indicating a range of operations pending in the queue.

1 11. A computer system, comprising:
2 a bus ;
3 a plurality of bus devices, each of which couples to said bus, and each of which is capable
4 of running cycles on said bus, and each of said bus devices includes a queue in which pending
5 operations are stored while the bus device awaits access to the bus;

6 a bus arbiter coupled to the bus, said bus arbiter receiving request signals from said
7 plurality of bus devices that are seeking to run a cycle on said bus;

8 wherein any of said devices that include one or more operations in its queue transmits a
9 signal to said bus arbiter requesting access to said bus and indicating the number of operations
10 pending in its associated queue; and

11 wherein said bus arbiter resolves conflicting requests from said bus devices based on the
12 number of operations pending in the queues of the requesting devices.

1 12. The system of claim 11, wherein each of said plurality of bus devices is capable of running
2 bus cycles on said bus, and wherein said signal requesting access to said bus is a request for
3 ownership of said bus.

1 13. The system of claim 11, wherein any bus devices with operations pending in a queue
2 transmit a request signal indicating a request for access to said bus, and a workload signal
3 indicating the number of operations pending in the queue.

1 14. The system of claim 13, wherein each bus device has a queue with the same number of
2 entries.

1 15. The system of claim 13, wherein at least two of said bus devices have queues with a
2 different number of entries.

1 16. A method of resolving conflicting bus access requests in a computer bus, comprising the
2 acts of:

3 determining if more than one bus device has requested access to the computer bus;

4 determining the workload associated with each bus device requesting access to the
5 computer bus; and

6 granting access to the bus device that has the greatest workload.

1 17. The method of claim 16, wherein the act of determining if more than one bus device has
2 requested access includes monitoring for a request signal from each of the bus devices capable of
3 initiating cycles on the computer bus.

1 18. The method of claim 16, wherein the act of determining the workload associated with each
2 bus device includes receiving a signal from each device indicating the number of operations
3 awaiting execution in that device.

1 19. The method of claim 18, wherein the number of operations awaiting execution is
2 determined based on the number of operations pending in a queue in that device.

1 20. The system of claim 16, further comprising the act of breaking any ties between devices
2 with equal workloads based on other priority criteria.